

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 06-088029

(43)Date of publication of application : 29.03.1994

(51)Int.Cl.

C08L 83/08  
C08G 77/388  
// C08F299/08

(21)Application number : 04-264194

(71)Applicant : SHIN ETSU CHEM CO LTD

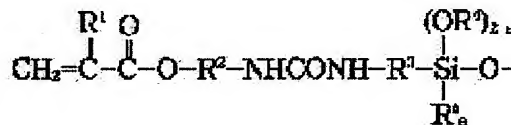
(22)Date of filing : 07.09.1992

(72)Inventor : INOUE YOSHIO

**(54) ULTRAVIOLET-AND MOISTURE-CURING ORGANOPOLYSILOXANE COMPOSITION, ITS CURED PRODUCT, AND ITS PRODUCTION****(57)Abstract:**

**PURPOSE:** To provide a ultraviolet- and moisture-curing organopolysiloxane composition which can easily be cured by ultraviolet irradiation or by contact with moisture, and can be cured to the depth within a short time to give a cured product of excellent properties.

**CONSTITUTION:** The composition comprises an organopolysiloxane terminated with a group of the formula (wherein R<sup>1</sup> is hydrogen or an (un)substituted monovalent hydrocarbon group; R<sup>2</sup> and R<sup>3</sup> are each an (un)substituted bivalent hydrocarbon group which may contain an NH bond or an ether bond; R<sup>4</sup> and R<sup>5</sup> are each an (un)substituted monovalent hydrocarbon group which may contain an ether bond; and a is 0 or 1), a photopolymerization initiator, and a curing catalyst.



\* NOTICES \*

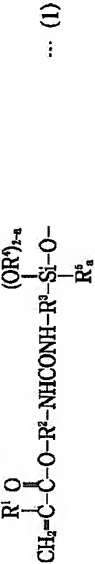
JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1](1) Organopolysiloxane which has a basis shown in molecular chain terminals with a following general formula (1), [Formula 1]



however, R<sup>1</sup> --- a hydrogen atom, substitution, or an unsubstituted monovalent hydrocarbon group. The substitution or the unsubstituted bivalence hydrocarbon group in which R<sup>2</sup> and R<sup>3</sup> may also include NH combination or an ether bond, R<sup>4</sup> and R<sup>5</sup> show the substitution or the unsubstituted monovalent hydrocarbon group which may also include an ether bond, and a is 0 or 1. The ultraviolet rays and the moisture curing nature organopolysiloxane constituent which contain (2) photopolymerization initiators and (3) curing catalysts, and are characterized by things. [Claim 2]A hardened material obtained by stiffening the ultraviolet rays according to claim 1 and a moisture curing nature organopolysiloxane constituent. [Claim 3](a) Organopolysiloxane which has a silanol group in molecular chain terminals, and the (b) following general formula (2)



however, the substitution in which R<sup>3</sup> may also include NH combination or an ether bond or an unsubstituted bivalence hydrocarbon group. The substitution in which R<sup>4</sup> and R<sup>5</sup> may also include an ether bond, or an unsubstituted monovalent hydrocarbon group, a is 0 or 1. Mix, the amino alkyl alkoxyane shown is made to react so that the silanol group in the alkoxy group / (a) ingredient in the (b) ingredient may become one or more by a mole ratio, and it is a following general formula (3) to molecular chain terminals.

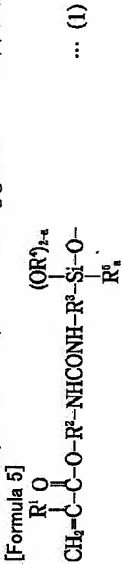


(however, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and a show the same meaning as the above.) --- this organopolysiloxane after obtaining the organopolysiloxane which has an amino alkyl group shown and a hydrolytic alkoxy group --- (c) following general formula (4)



however, R<sup>1</sup> --- a hydrogen atom, substitution, or an unsubstituted monovalent hydrocarbon group. R<sup>2</sup>

shows the substitution or the unsubstituted bivalence hydrocarbon group which may also include NH combination or an ether bond. Mix and the compound shown is made to react so that the NCO group in the amino group / (c) ingredient in the compound of the above-mentioned formula (3) may become 0.9 or more by a mole ratio, it is a following general formula (1) to molecular chain terminals.



(however, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and a show the same meaning as the above.) --- the organopolysiloxane which has a basis shown being obtained and, A manufacturing method of the ultraviolet rays mixing a photopolymerization initiator and a curing catalyst to this organopolysiloxane, and a moisture curing nature organopolysiloxane constituent.

[Translation done.]

## \* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application]The silicone rubber elastic body which hardens this invention promptly with UV irradiation and humidity, and has outstanding physical properties is given. It is related with the manufacturing method of ultraviolet rays and a moisture curing nature organopolysiloxane constituent useful as adhesives, a sealing compound, a coating agent, a potting agent, etc., its hardened material, and said constituent.

[0002]

[Description of the Prior Art]Conventionally, since it is easy to use it since a moisture curing nature constituent hardens with the humidity in the air only by extruding from a tube or a cartridge by 1 acidity or alkalinity, and also it has an advantage of not making an electric electronic component etc. corrode etc., it is generally used general-purpose in the electrical and electric equipment and the electronic industry, and the construction industry.

[0003]However, a moisture curing nature organopolysiloxane constituent is hardened with the humidity in the atmosphere.

If it extrudes in the atmosphere from a tube or a cartridge, it will take time to harden from the surface and to harden to the depths.

For this reason, when a moisture curing nature organopolysiloxane constituent was used for adhesion of electronic parts etc., or a seal and coating, since depths hardenability is late, there is a fault that speedup-ization of a part factory line cannot be performed, and an improvement of this point was desired.

[0004]On the other hand, about an ultraviolet curing nature organopolysiloxane constituent. What carries out photoaddition of vinyl group content organopolysiloxane and the sulfinyl group content organopolysiloxane by UV irradiation, and stiffens them is indicated to JP.52-40334B, JP.60-104158A, etc. However, although hardenability is good, since sulfinyl group content organopolysiloxane is used for these constituents, they have a corrosive problem over a bad smell or metal, and do not fit the use of an electric electronic component etc.

[0005]The constituent stiffened by ultraviolet rays by using acrylic group content organopolysiloxane together with a sensitizer is proposed by JP.53-36515B, JP.60-215009A, etc. However, especially these constituents are inferior to surface hardenability, and the hardenability which was excellent when it was not a thing of the shape of resin with much acrylic group content was not shown, but there was a problem in the ultraviolet curing nature.

[0006]Therefore, usability was good and development of the hardenability organopolysiloxane constituent which can moreover be promptly hardened from the surface to the depths was desired.

[0007]It was made in order that this invention might meet the above-mentioned request, and usability is good, and also it excels in case hardening nature and depths hardenability, and aims at providing the manufacturing method of the ultraviolet rays which give the hardened material which has good physical properties and a moisture curing nature organopolysiloxane constituent, its hardened material, and said constituent.

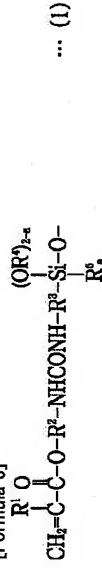
[0008]

[Means for Solving the Problem and its Function]By blending organopolysiloxane which has a basis shown in molecular chain terminals with a following general formula (1) as a result of repeating examination wholeheartedly, in order that this invention person may attain the above-mentioned

purpose, a photopolymerization initiator, and a curing catalyst. Can harden with both UV irradiation and humidity, and harden by UV irradiation for a short time, and. Excel in depths hardenability, case hardening nature, and the hardenability of ultraviolet-rays sheep irradiation portions, for example, hardening by UV irradiation and hardening by humidity are used together, On [ which can also harden with humidity a portion where ultraviolet rays do not glare directly in the case of hardening by UV irradiation ]. A hardened material which has good physical properties is given, and there are also no problems, such as a bad smell and corrosiveness, Usability is good and it found out that ultraviolet rays and a moisture curing nature organopolysiloxane constituent which can be broadly used as various sealing materials, a coating material, adhesives, etc. in construction, engineering-works industry, and electric electronic component industry were obtained.

[0009]

[Formula 6]



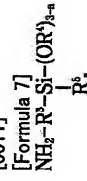
however, R<sup>1</sup> — a hydrogen atom, substitution, or an unsubstituted monovalent hydrocarbon group.

The substitution in which R<sup>2</sup> and R<sup>3</sup> may also include NH combination or an ether bond or an

unsubstituted bivalence hydrocarbon group, R<sup>4</sup>, and R<sup>5</sup> show the substitution or the unsubstituted monovalent hydrocarbon group which may also include an ether bond, and a is 0 or 1.

[0010]this invention person as a method of obtaining the above-mentioned organopolysiloxane, in this case, (a) The organopolysiloxane which has a silanol group in molecular chain terminals, (b) Mix and make the amino alkyl alkoxy silane shown with a following general formula (2) react so that the silanol group in the alkoxy group / (a) ingredient in the (b) ingredient may become one or more by a mole ratio. After obtaining the organopolysiloxane which has an amino alkyl group shown in molecular chain terminals with a following general formula (3), and a hydrolytic alkoxy group, By mixing and making the compound shown with the (c) following general formula (4) react to this organopolysiloxane so that the NCO group in the amino group / (c) ingredient in the compound of a following formula (3) may become 0.9 or more by a mole ratio. By adding a photopolymerization initiator and a curing catalyst to the organopolysiloxane which the organopolysiloxane which has a basis shown by the above-mentioned formula (1) in an end was obtained advantageously, and was produced by doing in this way, The knowledge of the ability to manufacture industrially advantageously the ultraviolet rays and the moisture curing nature organopolysiloxane constituent which were mentioned above is carried out, and it came to make this invention.

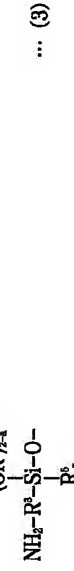
[0011]



(However, the substitution in which the substitution in which R<sup>2</sup> may also include NH combination or an ether bond or an unsubstituted bivalence hydrocarbon group, R<sup>4</sup>, and R<sup>5</sup> may also include an ether bond or an unsubstituted monovalent hydrocarbon group, and a are 0 or 1.)

[0012]

[Formula 8]



(However, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and a show the same meaning as the above.)

[0013]

[Formula 9]



(However,  $R^1$  shows the substitution or the unsubstituted bivalence hydrocarbon group for which a hydrogen atom, substitution or an unsubstituted monovalent hydrocarbon group, and  $R^2$  may also include NH combination or an ether bond.)

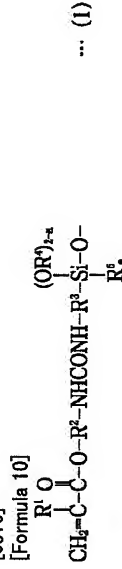
[0014] Therefore, after this invention obtains organopolysiloxane characterized by comprising the following. Mix and a compound shown in this organopolysiloxane by the (c) above-mentioned formula (4) is made to react so that an NCO group in the amino group / (c) ingredient in a compound of the above-mentioned formula (3) may become 0.9 or more by a mole ratio. A manufacturing method of the ultraviolet rays which organopolysiloxane which has a basis shown in molecular chain terminals by the above-mentioned formula (1) is obtained, and become this organopolysiloxane from mixing a photopolymerization initiator and a curing catalyst, and a moisture curing nature organopolysiloxane constituent.

(1) Organopolysiloxane which has a basis shown in molecular chain terminals by the above-mentioned formula (1), (2) Ultraviolet rays containing a photopolymerization initiator and (3) curing catalysts and a moisture curing nature organopolysiloxane constituent, a hardened material obtained by stiffening this constituent, and organopolysiloxane which has a silanol group in (a) molecular chain terminals.

(b) An amino alkyl group and a hydrolytic alkoxy group which are mixed, make amino alkyl alkoxy silane shown above (2) react so that a silanol group in the alkoxy group / (a) ingredient in the (b) ingredient may become one or more by a mole ratio, and are shown in molecular chain terminals by the above-mentioned formula (3).

[0015] Hereafter, when it explains in detail, ultraviolet rays of this invention and the first essential ingredient of a moisture curing nature organopolysiloxane constituent are organopolysiloxane which has per this invention and also a basis shown in molecular chain terminals with a following general formula (1).

formula  
[0016]



however,  $R^1$  -- a hydrogen atom, substitution, or an unsubstituted monovalent hydrocarbon group.

The substitution in which  $R^2$  and  $R^3$  may also include NH combination or an ether bond or an unsubstituted bivalence hydrocarbon group,  $R^4$  and  $R^5$  show the substitution or the unsubstituted monovalent hydrocarbon group which may also include an ether bond, and a is 0 or 1.

[0017] Here, a hydrogen atom or a methyl group is mentioned especially as R<sup>1</sup>. As R<sup>2</sup>, the alkylene group of the carbon numbers 1-8, for example, a methylene group, ethylene, a propylene group, etc. are mentioned. The alkylene group of the carbon numbers 1-8 which include the alkylene group of the carbon numbers 1-8, and NH combination or an ether bond as R<sup>3</sup> is mentioned. As R<sup>4</sup> and R<sup>5</sup>, an alkyl group, for example, the methyl group, an ethyl group, a propyl group, a methoxy ethyl group, etc. of the carbon numbers 1-4 are mentioned.

[0018] Organopolysiloxane which has a basis of the above-mentioned formula (1) in such molecular chain terminals, (a) Organopolysiloxane which has a silanol group in molecular chain terminals, (b) After obtaining organopolysiloxane which has an amino alkyl group shown by a general formula (3) which amino alkyl alkoxy silane shown by a general formula (2) mentioned later is made to react with a specific ratio, and is later mentioned to molecular chain terminals, and a hydrolytic alkoxy group, it is compoundable by making a compound shown by a general formula (4) which carries out (c) after-mentioned mix and react to this organopolysiloxane with a specific ratio.

[2019] In this case, what is shown with a following general formula (5) as organopolysiloxane which has a silanol group is suitably used for the above-mentioned molecular chain terminals.

[0020]

[Formula 11]



[O021]R<sup>6</sup> in the above-mentioned formula (5) and R<sup>7</sup> are the monovalent hydrocarbon radicals of unsubstituted [ with 1–8 carbon atoms ], or substitution here, respectively. For example, it is the basis which replaced some or all of the hydrogen atom that was combined with the carbon atom of aryl groups, such as alkenyl groups, such as low-grade alkyl groups, such as a methyl group, an ethyl group, and a propyl group, a vinyl group, and an allyl group, a phenyl group, and a tolyl group, a cyclohexyl group, or these groups by halogen atom, a cyano group, etc. R<sup>6</sup> and R<sup>7</sup> may be the bases of different species [ basis / same ], respectively.

[0022] In some embodiments,  $n$  is five or more integers, although it is an integer of 10–1000 preferably. As for organopolysiloxane of the above-mentioned formula (5), since it is preferred that 25 to 500,000 cs (centistokes) of viscosity at 25 °C is in the range of 1000 – 100,000 cs especially, it is desirable to adjust a value of  $m$  so that it may become the viscosity of a mentioned range.

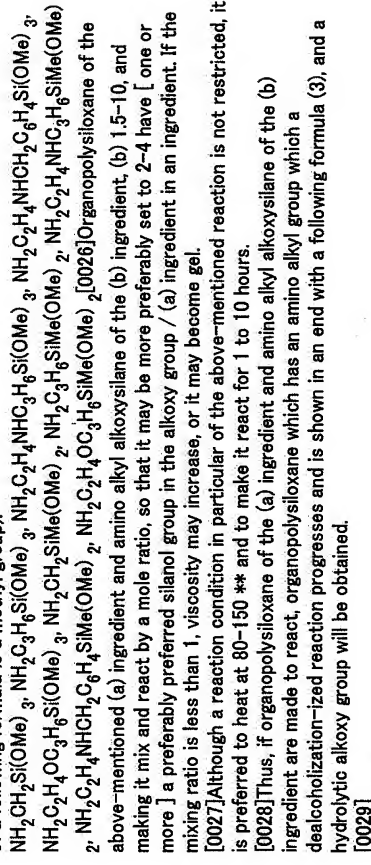
[0023] Alkoxysilane made to react to the above-mentioned silanol group end organopolysiloxane is shown by following formula (2).

[0024]

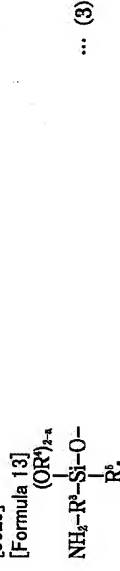


(However,  $R^3, R^4, R^5$ , and  $a$  show the same meaning as the above.)

[0025] Specifically, the following compound, the compound which replaced the alkoxy group of these compounds with other alkoxy groups, such as an ethoxy basis and a methyl Cellosolve group, etc. are illustrated as amino alkyl alkoxy silane of the above-mentioned formula (2) (in addition, the inside Me of a following formula is a methyl group).



[0029]



(However,  $R^3, R^4, R^5$ , and  $a$  show the same meaning as the above.)

[0030] Subsequently, in this invention, the amino alkyl group shown by the above-mentioned formula (3), and a hydrolytic alkoxy group to the organopolysiloxane which it has by mixing and making the compound of a following formula (4) react. The organopolysiloxane which has a basis of the above-mentioned formula (1) in molecular chain terminals can be obtained.

[0031]

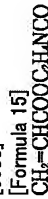
[Formula 14]



(However, R<sup>1</sup> and R<sup>2</sup> show the same meaning as the above.)

[0032]Specifically, isocyanate group content (meta) acrylic compounds, such as the following compound, etc. can be illustrated as a compound of this formula (4).

[0033]



[0034]As for the mixing ratio of the compound of the above-mentioned formula (4), it is desirable for the NCO group in the compound of the amino group/formula (4) in the organopolysiloxane which has the amino alkyl group and hydrolytic alkoxy group of the above-mentioned formula (3) to set to 0.95-1.05 preferably 0.9 or more by a mole ratio. If the mixing ratio is less than 0.9, an amino alkyl group may remain, and stability may be worsened.

[0035]In this case, although a reaction condition can be adjusted suitably, it is preferred to carry out at a room temperature for 1 to 3 hours, without generally heating.

[0036]A series of reactions mentioned above may be performed under existence of an organic solvent if needed, for example, solvents, such as toluene, xylene, benzene, hexane, and cyclohexane, can be used.

[0037]A photopolymerization initiator of the second essential ingredient of this invention constituent is required in order to promote a polymerization reaction of organopolysiloxane of the first ingredient which advances at the time of UV irradiation. As this photopolymerization initiator, concretely An acetophenone, propiophenone, Benzophenone, a KISAN toll, benzaldehyde, 4-methylacetophenone, 3-pentylacetophenone, a 4-methoxy acetophenone, 3-bromoacetophenone, 4-allylacetophenone, 3-methoxybenzophenone, p-chlorobenzophenone, 4-dimethoxybenzophenone, 4-chloro-4-benzylbenzophenone, 3-chloro KISAN toll, benzoin, benzoin methyl ether, A benzoin butyl ether, bis (4-dimethylaminophenyl)ketone, benzyl methoxy ketal, diethylacetophenone, 2, and 2-dimethoxy-2-phenylacetophenone, a diethoxyacetophenone, etc. can be illustrated.

[0038]Loadings of a photopolymerization initiator — 100 copies (a weight section.) of organopolysiloxane of the first ingredient the following — being the same — it is preferred to receive and to consider it as the range of 0.01-5 copies, unless it is less than 0.01 copy, a blending effect may not be acquired, even if it blends exceeding five copies, a prominent effect is not acquired, but it may become disadvantageous economically.

[0039]A curing catalyst of the third essential ingredient is a catalyst required in order to carry out moisture curing of this invention constituent. For example, tin carboxylate, such as naphthenic acid tin, tin caprylate, and tin oleate, Dibutyltin diacetate, dibutyl tin JIOKUTOTETO, dibutyltin dilaurate, dibutyl tin diolate, diphenyl tin diacetate, dibutyl tin oxide, dibutyl tin dimethoxide, dibutylbis (TORIETOKISHI siloxy)tin, Tin compounds, such as dibutyl tin benzyl malate, Titanate, such as tetraethoxytitanium, tetraisopropoxy titanium, tetra-n-butoxytitanium, tetrakis (2-ethyl HEKISOKISHI) titanium, dipropoxybis (acetyl) ASETONA) titanium, and CHITANYUMU isopropoxy octylene glycol. Or titanium chelate compound etc. are illustrated.

[0040]Although loadings in particular of a curing catalyst are not restricted, if it is desirable to make [ as opposed to / especially / 100 copies of organopolysiloxane of the first ingredient ] five or less copies into 0.5-3 copies generally and it exceeds five copies, preservation stability may worsen or may spoil the characteristic after hardening.

[0041]In this invention, in order to improve the activity of the above-mentioned catalyst, a basic compound may be used together. As a basic compound, for example, amines, such as octyl amine and lauryl amine, Cyclic amidines, such as imidazoline, tetrahydro pyrimidine, and the 1,8-diaza-bicyclo (5.4.0) undecene 7 (DBU), Guanidyl group content Silang and these partial hydrolysates, such as super-strong bases, such as guanidine, tetramethyl guanidyl propyltrimethoxysilane, tetramethyl guanidyl propyl dimethoxysilane, and tetramethyl guanidyl propyltris (trimethylsiloxy) Silang, A guanidyl

group content siloxane etc. are mentioned. An addition of a basic compound is used in 0.1-3 copies. [0042]In order to improve the seal preservability of a hardenability constituent, Silang which has two or more hydrolytic bases in a monad in addition to the above-mentioned essential ingredient, or its partial hydrolysate may be blended with this invention constituent.

[0043]As the above-mentioned silane compound, specifically, A methyl group in methyl trimethoxysilane, MECHIRUTORI (methylethyl ketoxime) Silang, a MECHIRUTORI propenyloxy silane, methyltriacetoxysilane, a MECHIRUTORI n-butylamino silane, or these silane compounds A vinyl group, a phenyl group, Silane compounds, tetramethoxy silanes, tetraethoxysilanes, tetra butoxysilane, etc. which were replaced by trifluoropropyl etc., these partial hydrolysates, etc. are illustrated.

[0044]As for especially the loadings, although Silang mentioned above or its partial hydrolysate may use one sort alone or may use it combining two or more sorts, it is preferred to make 1-20 copies into 3-100 copies of organopolysiloxane of the first ingredient.

[0045]A bulking agent may be blended with this invention constituent if needed for the purpose of improvement in hardening rubber strength, increase in quantity, thixotropy grant, etc. As a bulking agent, specifically Impalpable powder silica, such as fumed silica, pyrogenic silica, precipitated silica, grinding silica, and fused silica powder, diatomite, iron oxide, a zinc oxide, titanium oxide, barium oxide, and oxidation — a mug — metallic oxides, such as NESHUMU, Metallic carbonate, such as calcium carbonate, carbonic acid magnesium, and zinc carbonate, What carried out canal processing of metal hydroxide, such as hydroxylation cerium and hydroxylation aluminum, glass fiber, glass wool, carbon black, fines mica, asbestos, spherical silica, spherical silsesquioxane powder, or these surfaces in Silang etc. is illustrated. Although loadings of a bulking agent change also with kinds of bulking agent, they are used in 5 to 500 copies to 100 copies of organopolysiloxane of the 1st ingredient.

[0046]An additive agent currently used for this kind of constituent from the former if needed in addition to the above-mentioned ingredient can be blended with a constituent of this invention in the range by which the purpose of this invention is not spoiled. As such an additive agent, for example Thixotropy grant agents, such as a polyethylene glycol and its derivative, Fire retardant, such as paints, a color, an antiaging agent, an antioxidant, a spray for preventing static electricity, antimony oxide, and chloroparaffin, It is arbitrary and adhesive grant agents, such as an organosilicon compound which has reactive organic groups, such as thermally conductive improving agents, such as boron nitride and oxidation aluminum, an amino group, an epoxy group, and a sulfinyl group, a silane coupling agent, etc. can be added.

[0047]This invention constituent for expedient nature at the time of use at the time of applying this to a base Hydrocarbon system solvents, such as toluene, xylene, and petroleum ether, it may dilute with solvents, such as ketone and ester species, and also they are a plasticizer, a dripping inhibitor, a publicly known stain proofing agent, an antiseptic, a germicide, and \*\*. Blending an agent etc. does not interfere at all.

[0048]After a constituent of this invention compounds organopolysiloxane which has a basis of a formula (1) in molecular chain terminals by an above-mentioned method, By mixing uniformly each ingredient which a photopolymerization initiator, a curing catalyst, etc. mentioned above in a drying atmosphere, as 1 liquid type ultraviolet rays and a moisture curing nature constituent, Or organopolysiloxane of a formula (1), a photopolymerization initiator, a curing catalyst, etc. can be considered as another package, and it can prepare as two-component ultraviolet rays and a moisture curing nature constituent which mix and use these at the time of use.

[0049]Also by crosslinking reaction's advancing and hardening with humidity in the air, if this is exposed into the air, and irradiating with ultraviolet rays, crosslinking reaction advances and hardens ultraviolet rays of this invention, and a moisture curing nature organopolysiloxane constituent, and they serve as a rubber elastomer excellent in the various characteristics. As for a portion where especially this invention constituent can use together hardening by UV irradiation, and hardening by humidity, for example, ultraviolet rays do not glare directly at the time of hardening by UV irradiation, it is possible to make it harden with humidity. Although crosslinking reaction conditions in particular by humidity are not limited, it can usually be considered as 1 to 24 hours at 10-35 \*\*, and what is necessary is just to hit exposure conditions by ultraviolet rays to the usual ultraviolet ray lamp several minutes from several seconds, and they are similarly hardened in sunlight.

[0050]

[Effect of the Invention]The ultraviolet rays of this invention, and a moisture curing nature organopolysiloxane constituent, It is what gives the hardened material which hardened easily also with



humidity, hardened from the surface to the depths for a short time, and was excellent in various physical properties also by UV irradiation, it can be broadly used as the adhesives of an electric electronic component, a sealing compound, a POSSHINGU agent, etc. as construction, the various sealing materials in engineering-works industry, and a coating material.

[0051]

[Example] Although a synthetic example and an example are shown and this invention is explained concretely hereafter, this invention is not restricted to the following example. Each part in each example is a weight section, and viscosity is the measured value in 25 °C.

[0052] The synthetic example 1) 100 g (the amount of silanols of 0.015 mol/100 g) of organopolysiloxane to which the viscosity at 25 °C has a silanol group in the both ends of 700cs, it heated at 120 °C, having taught 3 g of gamma-aminopropyl trimethoxysilane to a 300-ml flask, and carrying out N<sub>2</sub> gas aeration, and the demethanol reaction was performed for 3 hours. Then, meta-acryloxyethyl isocyanate (2.6 g was added and it was made to react at a room temperature for 30 minutes) Viscosity [ in / in the obtained polymer / 25 °C ] is a transparent fluid of 950cs.

When liquid chromatography and infrared spectroscopic analysis analyzed, it was checked that chain both ends are dimethylpolysiloxane shown with a following formula.

[0053]

[Formula 16]



[0054] The synthetic example 2) 100 g (the amount of silanols of 0.010 mol/100 g) of organopolysiloxane to which the viscosity at 25 °C has a silanol group in the both ends of 1500cs, it heated at 120 °C, having taught 3 g of gamma-aminopropyl trimethoxysilane to a 300-ml flask, and carrying out N<sub>2</sub> gas aeration, and the demethanol reaction was performed for 3 hours. Then, 1.6 g of meta-acryloxyethyl isocyanate was added, and it was made to react at a room temperature for 30 minutes. Viscosity [ in / in the obtained polymer / 25 °C ] is a transparent fluid of 1750cs.

When liquid chromatography and infrared spectroscopic analysis analyzed, it was checked that chain both ends are dimethylpolysiloxane shown with a following formula.

[0055]

[Formula 17]



[0056] [Examples 1 and 2] The hardenability organopolysiloxane constituent of the presentation shown in Table 1 using the polymer obtained in the synthetic examples 1 and 2 was prepared.

[0057] The obtained constituent was stiffened under UV irradiation or a room temperature by the following method, and the physical properties of each hardened material were measured. A result is shown in Table 1.

Ultraviolet curing: After extruding a class product to a 2-mm sheet shaped and irradiating with ultraviolet rays 3 times at the rate of 1 m/min. using black light ASE-20 (made by Japan Storage Battery Co., Ltd.), it was neglected for 30 minutes and physical properties were measured according to JISK-6301.

Room temperature curing: After having intercepted light so that ultraviolet rays might not hit under the conditions of the temperature of 20 °C, and 55% of humidity, after extruding a class product to a 2-mm sheet shaped, and neglecting it for seven days, physical properties were measured according to JISK-6301.

[0058] From the result of Table 1, the hardenability organopolysiloxane constituent of this invention was easily hardened with the humidity under UV irradiation and a room temperature, and giving the hardened material which has the almost same good rubber physical property was checked.

[0059]

[Table 1]

組成 (部)	実施例 1		実施例 2	
	UV	RTV	UV	RTV
合成例 - 1 のポリマー		100		
合成例 - 2 のポリマー			100	
比表面積 1.20 m <sup>2</sup> / g の疎水性シリカ		10		10
ジエトキシアセトフェノン		2		2
メチルトリメトキシシラン		3		3
ジブチル錫ジラウレート		0.2		0.2
γ-テトラメチルグアナニジルプロピルトリメトキシシラン		0.5		0.5
硬さ (JIS-A)	35	30	30	31
伸び (%)	120	130	200	210
引っ張り強さ (kg/cm <sup>2</sup> )	18	20	15	17

[Translation done.]